Clean Land

LONG-TERM SOLUTION FOR WORLD'S MOST ACIDIC POLLUTION

Iron Mountain Mine Superfund Site

A strange thing happenned last year at the former Iron Mountain Mine near Redding, California: A shovel, left in a puddle overnight, dissolved. Subsequent analysis showed this water to be the **most acidic ever found,** registering below zero on the pH scale.

Unfortunately, it's more than a scientific oddity. For over a century, this **acidic runoff,** laden with toxic dissolved metals, flowed downstream into the Sacramento River, **polluting a major drinking water source and sometimes killing thousands of salmon.**

From the late 1800's through 1963, mining at Iron Mountain produced iron, gold, silver, copper, zinc, and pyrite, using both underground tunnels and open pits. Mining scarred the mountain and honeycombed it with tunnels, allowing rainwater to flow through, and exposing mineral deposits to oxygen, water and certain bacteria which thrive on dissolved metals. The resulting continuous chemical reaction dissolves the metals in the rock and generates acid.

To stem the pollution, EPA has directed cleanup actions which include diverting clean upstream water around the mine, and building a treatment plant that removes dissolved metals and neutralizes acid from the mine's toxic outflow. These actions have **reduced water pollution downstream from the mine by over 80%.** Since 1994, the treatment plant has removed more than five million pounds of dissolved metals, including copper, cadmium and zinc, that would otherwise have polluted the river. Earlier, the mine was discharging roughly a ton of dissolved copper and zinc *per day*—equal to about a quarter of the total copper and zinc discharges from all factories and sewage treatment plants *in the entire United States.*

The treatment plant also neutralizes the water's acidity, but in doing so it generates a solid sludge that must be trucked back up the mountain and dumped into pits left by earlier mining. This system must continue indefi-

nitely, and therein lay a problem: How to ensure sufficient funding for generations to come?

In October 2000, EPA and the state of California finalized a settlement with **Aventis CropSciences USA, Inc. to pay up to $1 billion for future Iron Mountain cleanup costs.** Aventis, successor to onetime mine owner Rhone Poulenc, Inc., has arranged for The IT Group to operate and maintain the cleanup system over the next 30 years, and to pay $514 million in the year 2030 for cleanup after that.

Aventis, which has an insurance plan specifically tailored for this settlement, will pay roughly $160 million now for the first 30 years of operation (estimated cost: $200 to $300 million), pay EPA approximately $8 million for some of its costs, and pay state and federal agencies $10 million for ecological restoration. The settlement also waives $150 million in past cleanup costs.

What's Next At Iron Mountain

EPA and the state of California will soon construct a new dam on Slickrock Creek to collect additional acid mine drainage and send it to the treatment plant. When this is done, cleanup actions at Iron Mountain will have slashed toxic dissolved metals discharged by 95%.

Agencies cooperating with the EPA on Iron Mountain include the National Oceanic and Atmospheric Administration (NOAA), the federal Bureaus of Land Management (BLM) and Reclamation, the U.S. Department of Justice, the U.S. Fish and Wildlife Service, the National Marine Fisheries Service, Cal/EPA, the state Department of Fish and Game and Department of Toxic Substances Control, the Central Valley Water Quality Control Board, the State Lands Commission, and the state Resources Agency.

*For more information about Iron Mountain Mine, go to **www.epa.gov/region09/features/ironmountain.html,** e-mail sugarek.richard@epa.gov, or write EPA Superfund Program, 75 Hawthorne Street, San Francisco, California, 94105.*

CLEANING UP THE PALOS VERDES SHELF

Sea Floor Contaminated With DDT

Cleaning up toxic contamination on the ocean floor poses a difficult cleanup challenge. Last year, after extensive planning, EPA conducted a pilot project to cover 45 acres of DDT-contaminated sea floor off Palos Verdes, California, with a layer of clean sand, to prevent the uptake of toxins by marine life. Dredge barges dropped hundreds of tons of clean sediment over the 45-acre area. EPA will use data from this project to help decide whether a larger-scale effort is the best long-term cleanup option for the entire **contaminated area—17 square miles.**

EPA SUPERFUND PROGRAM

White croaker, a common fish in the waters off Palos Verdes, California, is unsafe to eat due to offshore DDT contamination. EPA's Palos Verdes Shelf Pilot Project is testing a method to prevent contamination of the area's marine life. ***Previous page:*** *Massive water treatment plant at Iron Mountain Mine near Redding, California, neutralizes acid and removes toxic dissolved metals from the mine's runoff. Photo by U.S. Bureau of Reclamation.*

From 1947 to 1983, the Montrose Chemical Corp. produced the now-banned pesticide **DDT** at a factory near Torrance, California. All this time, Montrose discharged DDT-laden wastewater into sewers that empty into the ocean off the Palos Verdes peninsula. The **DDT** settled on he undersea Palos Verdes Shelf. The long-lasting poison still covers 17 square miles of ocean floor, where it **threatens fish, seabirds, and people who eat local fish.**

DAVID D. SCHMIDT

Whimsical fountain in Stockton, California's downtown waterfront redevelopment area attracts children on hot days. EPA Brownfields grants sped the neighborhood's revival.

Paying For The Cleanup

Cleaning up this undersea contamination, in addition to the ongoing excavation, removal, and safe disposal of DDT-contaminated soil near the former Montrose factory site, does not come cheap. **Under the federal Superfund law, responsible parties must pay for the cleanup.** On December 19, 2000, EPA, the U.S. Department of Justice, and the California Attorney General announced a $73 million settlement with Montrose Chemical Corp., Aventis CropScience USA Inc., Chris-Craft Industries Inc., and Atkemix Thirty-Seven Inc. Along with prior settlements, this adds up to about $140 million that can be used to clean up DDT and PCBs, and restore fish and wildlife.

*For more details, go to **www.epa.gov/region09/features/pvshelf***

CLEARING THE WAY FOR REDEVELOPMENT

Superfund Sites, Military Bases, Brownfields

EPA's Superfund Program in the past few years has focused not only on cleanup of toxic sites, but on clearing away obstacles to redevelopment.

At the Operating Industries Inc. site in **Monterey Park, Southern California,** a former hazardous and solid waste landfill where cleanup is nearly complete, EPA last year reached a unique settlement in which developers and the former owner/operators will share the cost of cleaning up a portion of the site slated for a new shopping mall.

Since the closing of several military bases in the Pacific Southwest in the early 1990's, EPA has worked with the military services to assess and clean up lingering toxic contamination that holds up redevelopment. EPA supports rapid reuse of the clean portions of these bases.

For example, last year EPA approved the transfer of 760 acres of **Monterey County's Fort Ord,** including the Fritzche Army Airfield and 170 housing units, to the city of Marina for reuse. EPA also approved transfer of a clean portion of the **Hunters Point Naval Shipyard** to San Francisco. This tract, "Parcel A," was formerly military housing. The Army and Navy are continuing cleanup work on other parts of these former bases.

EPA's **Brownfields Program** kicked into high gear in 2000, with many cities completing site assessments using

EPA'S Richard W. Martyn Honored For San Diego Cleanup

An EPA employee for more than 20 years, Richard W. Martyn is one of the EPA Superfund Division's specially-trained On-Scene Coordinators, who are on call 24 hours a day to respond to chemical spills, fires, explosions and other accidents involving hazardous materials.

Martyn has managed dozens of emergency cleanups, including one at Cajon Pass in 1996, where a train derailment caused the largest release of hazardous chemicals in California transportation history. His biggest project in 2000 was in the City Heights neighborhood of San Diego, where radioactive materials and toxic ash were found in soil adjacent to homes at 38th and Redwood Streets.

San Diego's city government sought assistance from EPA's Superfund Emergency Response Program. Superfund assigned Martyn to the site. Once there, he arranged for testing of soil and homes which had been built atop buried ash. He also spent many hours with residents in City Heights explaining the hazards, describing cleanup plans, and answering questions.

Once the cleanup began, Martyn donned a chemical protective suit and directed a crew of workers in similar protective gear as they excavated the radioactive material and removed it to a safe disposal site. Later, he supervised the removal of a three-foot layer of lead-contaminated soil from around the homes—96 truckloads of it, roughly 2,200 tons. The soil was taken to a hazardous waste landfill. Martyn's crew then backfilled the residents' yards with clean soil. The source of the contamination remains unknown.

In an unprecedented gesture of thanks, the city of San Diego proclaimed January 22, 2001 as Richard W. Martyn Day. Martyn graciously returned the compliment, declaring that "the success achieved in resolving the threat to public health at the 38th Street site was the result of an unwavering partnership between the City of San Diego and the EPA."

PHOTO COURTESY EPA SUPERFUND PROGRAM

Richard W. Martyn explains 38th St. (San Diego) cleanup plans to neighborhood residents.

The 38th Street cleanup was just one of 23 completed in the Pacific Southwest Region last year by EPA's Superfund Emergency Response Program—including three oil spills.

To report oil or toxic chemical spills or leaks, call the National Response Center toll-free at 1-800-424-8802.

EPA Brownfields grant funds. Assessment work cleared the way for $80 million in new investment and redevelopment in **Stockton, California's downtown waterfront** area. Assessment at a closed landfill in **Long Beach, California,** will turn this property into a neighborhood sports park. An Urban Design study completed in **East Palo Alto** resulted in a plan for office, high-tech and residential areas likely to generate about 4,000 jobs. **Los Angeles** selected a developer to build over a million square feet of manufacturing space and invest over $80 million to develop a vacant site in an industrial area, while **West Hollywood's Gateway Center** project will create a mixed-use office, retail and restaurant complex expected to generate $1.7 million in taxes annually.

To help local residents get jobs in their neighborhoods, EPA awarded **Brownfields Job Training grants to Los Angeles and Long Beach.** Three northern California communities with EPA job training grants are already having success by placing program graduates in high-paying environmental remediation or construction jobs. The 24 graduates of Young Community Developers Environmental Employment program in San Francisco, for example, earn an average hourly wage of $29.

These successes in the Pacific Southwest helped EPA's national Brownfields Program win two prestigious awards in 2000—The Hammer Award for Reinventing Government, and the Ford Foundation/Harvard Univer-

sity Kennedy School of Government Innovations in American Government Award.

For more information, go to ***www.epa.gov/brownfields***

LAND CLEANUPS ACROSS THE PACIFIC SOUTHWEST

State and local governments don't have the resources necessary to clean up all the toxic sites that threaten human health and the environment – or to pursue the often-complex legal actions needed to ensure that responsible parties, whenever possible, pay for the cleanups. That's where EPA's Superfund Program comes in. These are just a small sample of Superfund's successes in the Pacific Southwest Region in 2000:

On **Saipan,** a Pacific island north of New Guinea, U.S. armed forces decades ago left a shipment of 55 electrical capacitors near Tanapag Village, a residential area. Over the years, the abandoned capacitors leaked, releasing toxic polychlorinated biphenyls (PCBs) into the surrounding soil. Last year, EPA ordered the U.S. Army Corps of Engineers to remove the PCB-contaminated soil from the village. Under EPA oversight, the Corps removed truckloads of the tainted soil to a safe storage site, where it awaits thermal desorption treatment.

In **Richmond, California,** EPA and the state Department of Toxic Substances Control (DTSC) removed thousands of cubic yards of lead-contaminated soil from a public housing project.

Work crews trucked the soil to an approved hazardous waste landfill for disposal.

In **Oakland, California,** responsible party AlliedSignal (now Honeywell International) completed removal of lead-contaminated soil at 36 residential properties near a former lead battery factory. This work, done under EPA oversight, was the final phase of a cleanup that began with removal of lead-contaminated sand and soil from neighboring Verdese Carter Park, an urban playground.

In **West Covina** (**Los Angeles County**), EPA negotiated an agreement in which BKK Corp. agreed to clean up groundwater contaminated by toxics leaking from the firm's landfill. The **BKK Landfill** was the largest in the Pacific Southwest, taking in 3.4 million tons of liquid and solid hazardous waste before it closed 1989. The cleanup will cost BKK about $12.5 million.

PHOTO COURTESY EPA SUPERFUND PROGRAM

EPA's Superfund Emergency Response Program removed mercury-contaminated mud, gravel, and wood from the former Polar Star Mine near Dutch Flat in California's Gold Country.

At **Luke Air Force Base** in Maricopa County, and the **Marine Corps Air Station Yuma,** both active military bases in **Arizona,** the military services completed cleanup of dozens of sites that had been contaminated with hazardous wastes. The cleanups were conducted under EPA oversight.

MINING SITE CLEANUPS

Historic mining throughout the West has left thousands of sites polluted with toxic metals, acids, and other poisons that can be washed into nearby rivers and lakes by rainfall and snowmelt. Last year EPA conducted cleanups at some of the highest priority sites:

At the **Leviathan Mine** site near Markleeville in **Alpine County, California,** EPA directed cleanup actions

by two responsible parties, ARCO and the state's Lahontan Regional Water Quality Control Board. In 2000, the Regional Board treated 13 million gallons of acid mine drainage water that otherwise would have polluted Leviathan Creek, Bryant Creek, and the East Fork of the Carson River. This acid mine drainage, laced with toxic dissolved metals, has at times killed endangered Lahontan cutthroat trout. ARCO is designing a long-term strategy to prevent pollution from the mine site.

At the **Polar Star Mine**, a former hydraulic gold mine site near **Dutch Flat** in California's Gold Country, U.S. Geological Survey scientists suspected they'd find mercury after reading an Internet account of a man who had dredged up 40 pounds of mercury to yield a pound of gold. Sure enough, they found beads of the highly toxic, silvery liquid metal in an old drainage tunnel. In the 1800s, miners had routinely scattered mercury on the bottom of such tunnels to extract gold from the mud and gravel.

During the rainy season, runoff still drains through these tunnels, carrying mercury downstream to rivers and lakes, where it can accumulate to toxic levels in fish—and people who routinely eat local fish. EPA last year scooped out mud, gravel, and decaying wood from the old tunnel, and separated out the heavier mercury using a centrifuge. The project is expected to serve as a model for future mercury cleanups.

Tons more mercury remains scattered over thousands of **old Sierra Nevada mine sites**, posing a risk to recreational miners who try to retrieve small amounts of gold from it, as well as a hazardous waste disposal problem. Since cleanups of all the sites would be impractical, EPA worked with the U.S. Forest Service and Bureau of Land Management (BLM) on an **innovative voluntary program to collect mercury** from the weekend miners, to be safely recycled.

The program began with Forest Service and BLM employees asking recreational mining clubs to turn in mercury they had collected. The miners, glad to be rid of the toxic heavy metal, turned in 230 lbs. of pure mercury in the first three months. **Nevada County's** government also began accepting mercury along with other hazardous wastes people can bring in for recycling and disposal on designated days.

In San Luis Obispo County, California, streams and creeks downstream from the **Buena Vista Mercury Mine** were found to be contaminated with mercury. Since mercury bioaccumulates, this mercury posed a threat to people who eat fish from **Lake Nacimiento,** further downstream, which is one the state's most popular fishing spots and a water source for farms and cities. The responsible parties started a cleanup at the mine site, but EPA took charge when they ran short of funds. At the peak of EPA's operation in September 2000, work crews were moving 4,000 cubic yards of mercury mine tailings out of the watershed per day, just in time to prevent mercury-laden runoff during the rainy season.